

CLAIMS

We claim:

- 5 1. An item comprising:
 an outer part including at least one outer material that is substantially opaque to
 visible light; and
 an identifier including at least one three-dimensional configuration corresponding
 to the identifier, the at least one three-dimensional configuration being embedded within
10 the at least one outer material and including at least one of
 - (1) a substantially empty cavity in the at least one outer material, or
 - (2) at least one identifying material filling at least part of a cavity in the at
 least one outer material and wherein the at least one outer material
 in which the at least one identifying material fills at least part of
15 the cavity is substantially opaque to visible light.
2. The item of claim 1, wherein the at least one outer material is transmissive to RF
 radiation.
- 20 3. The item of claim 1, wherein the item is produced by rapid prototyping.
4. The item of claim 1, wherein the identifier identifies the item as a member of a set
 of similar items.
- 25 5. The item of claim 1, wherein the identifier identifies the item uniquely.
6. The item of claim 1, wherein the at least one three-dimensional configuration is
 completely enclosed by the at least one outer material.

7. The item of claim 1, wherein the at least one three-dimensional configuration is directly accessible by physically separating the at least one portion into at least two parts.

8. The item of claim 1, wherein the at least one three-dimensional configuration is
5 directly accessible only by disassembling the item.

9. The item of claim 1, wherein the at least one identifying material emits identifying electromagnetic radiation when irradiated with specified electromagnetic radiation.
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10. The item of claim 9, wherein the identifying material comprises a re-radiating antenna.

11. The item of claim 9, wherein the identifying material comprises a security tag.
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12. The item of claim 9, wherein the identifying material comprises a radio-frequency identification device.

13. A method of identifying the item of claim 1, the method of identifying
20 comprising:
detecting the at least one three-dimensional configuration with a penetrating imaging tool, the detecting resulting in an output from the penetrating imaging tool; and
reading the identifying information by interpreting the output.

25 14. The method of claim 13, wherein the penetrating imaging tool includes an x-ray imager.

15. The method of claim 13 wherein the penetrating imaging tool includes a magnetic-resonance imager.
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16. The method of claim 13, wherein the penetrating imaging tool includes an acoustic imager.

17. The method of claim 13, wherein the penetrating imaging tool emits acoustic energy and detects an acoustic signature in response to the emitted acoustic energy.

18. The method of claim 13, wherein the at least one identifying material emits identifying electromagnetic radiation when irradiated with specified electromagnetic radiation.

19. The method of claim 18, wherein the identifying material includes a re-radiating antenna.

20. The method of claim 18, wherein the identifying material includes a security tag.

21. The method of claim 18, wherein the identifying material includes a radio-frequency identification device.

22. A method of making an item, the method comprising:
forming at least one portion of the item from at least one structural material; and
integrally with said forming the at least one portion, enclosing within the at least one structural material identifying information that identifies the item, the identifying information including at least one three-dimensional configuration corresponding to the identifying information, the at least one three-dimensional configuration including at least one of

- (1) a void substantially shaped as the at least one three-dimensional configuration, the void defined by the at least one structural material, or
- (2) an identifying material substantially shaped as at least part of the at least one three-dimensional configuration, wherein the at least one structural material is substantially opaque to visible light.

23. The method of claim 22, wherein the void is substantially empty.
24. The method of claim 22, wherein the identifying information identifies the item as
5 a member of a set of similar items.
25. The method of claim 24 further including validating authorization to produce the item number responsive to the identifying information.
- 10 26. The method of claim 24, wherein the set of similar items is a set of at least one item provided by a particular vendor.
27. The method of claim 22, wherein the identifying information identifies the item uniquely.
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28. The method of claim 27, wherein the identifying information identifies the item uniquely by including a serial number that is unique to the item.
29. The method of claim 22, wherein the enclosing comprises making the identifying
20 information invisible from outside the item.
30. The method of claim 22, wherein the structural material is substantially opaque to visible light.
- 25 31. The method of claim 22, wherein the structural material is a visible light blocking material.
32. The method of claim 22, wherein the enclosing comprises making the identifying information directly accessible by physically separating the at least one portion into at
30 least two parts.

33. The method of claim 22, wherein the enclosing comprises making the identifying information directly accessible only by disassembling the item.

34. A method of making an item, the method comprising:

5 forming at least one portion of the item from at least one structural material; and
integrally with the forming the at least one portion, enclosing within the at least structural material a void substantially shaped as at least one three dimensional configuration corresponding to identifying information that identifies the item, the void being defined by the at least one structural material.

10 35. The method of claim 34, further comprising:

integrally with the forming the at least one portion and with the enclosing the void within the at least one structural material, enclosing within the void at least one identifying material substantially shaped as at least part of the at least one three-
15 dimensional configuration.

36. The method of claim 34, wherein the void is substantially empty.

37. A method of forming a computer-readable representation of an item, the method
20 comprising:

forming an outer surface computer-readable representation part including a representation of the outer surface of the item;

forming an identifying surface computer-readable representation part of at least one closed three-dimensional identifying surface, the at least one identifying surface
25 corresponding to identifying information that identifies the item, and the at least one identifying surface being contained within the outer surface; and

associating the outer surface computer-readable representation part and the identifying surface computer-readable representation part.

30 38. The method of claim 37, the item to be produced using rapid prototyping.

39. The method of claim 37, wherein the outer surface computer-readable representation part comprises a representation of at least one outer material from which the outer surface is to be shaped.

5 40. The method of claim 37, wherein the identifying surface computer-readable representation part comprises a representation of at least one identifying material that is to be placed within the identifying surface.

41. The method of claim 37, wherein the identifying information identifies the item
10 uniquely.

42. The method of claim 37, wherein the identifying information identifies the item as a member of a set of similar items.

15 43. A method of manufacturing an item, the method comprising:
forming a computer-readable representation of the item, the computer-readable representation including a representation of at least one three-dimensional configuration, the at least one three-dimensional configuration corresponding to identifying information that identifies the item; and

20 producing the item using the computer-readable representation of the item, the item including

(1) at least one structural material, and

(2) the at least one three-dimensional configuration, the at least one three-dimensional configuration including at least one of

25 (a) a void within the at least one structural material, or

(b) at least one identifying material substantially shaped as at least part of the at least one three-dimensional configuration and enclosed within the at least one structural material, wherein the at least one structural material enclosing the at least one identifying material is
30 substantially opaque to visible light.

44. The method of claim 43, wherein the identifying information identifies the item as a member of a set of similar items.

5 45. The method of claim 43, wherein the identifying information identifies the item uniquely.

46. The method of claim 43, wherein the producing comprises making the at least one three-dimensional configuration invisible from outside the item.

10 47. The method of claim 43, wherein the producing comprises making the three-dimensional configuration directly accessible by physically separating the at least one portion into at least two part.

15 48. The method of claim 43, wherein the producing comprises making the three-dimensional configuration directly accessible only by disassembling the item.